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STATISTICAL BULLETIN

METROPOLITAN LIFE INSURANCE COMPANY

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Urban Areas Most Affected by Declining Birth Rates

GENERALLY speaking, birth rates in the last 10 years have decreased most rapidly in those States where the population is concentrated in urban communities and is largely engaged in manufacturing and mechanical industries. This conclusion is based upon an examination of the percent changes in recorded birth rates in the several States of the Union, from the five-year period 1928 to 1932 to the period 1933 to 1937. The percent changes in birth rates from the earlier to the later period is shown graphically in the map on page 2.

The States showing decreases of 10 percent or more in the birth rate within the last decade form a solid block from New England in the East to Nebraska in the Midwest. Altogether, the States included in this area contained a population of 64,968,000 in 1937, or slightly more than half (50.2 percent) that of the whole country. In this block are the heavily industrialized States of Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, and Ohio. It is true that Virginia, Nebraska, and Arkansas, also included in this block, are predominantly agricultural. These are the exceptions to the rule; but on the other hand, there is no highly industrialized State with a below-average decline in the birth rate. Even Michigan, with its 20.2 percent industrialized population, recorded a percent drop of 8.5.

With the exception of California, Kansas, and North Dakota, the States with decreases of 5 to 9 percent in the birth rate from the earlier period, 1928 to 1932, to the later period, 1933 to 1937, are located east of the Mississippi. In this category, comprising 33,454,000 persons, or 25.9 percent of our total population (1937), will be found Maine, Vermont, Michigan, and Wisconsin in the North, and West Virginia, Kentucky, Tennessee, North Carolina, Alabama, and Florida in the South. Of these States, California, Michigan, Wisconsin, and Florida had more than half of their people congregated in urban communities of 2,500 or more at the date of the last census.

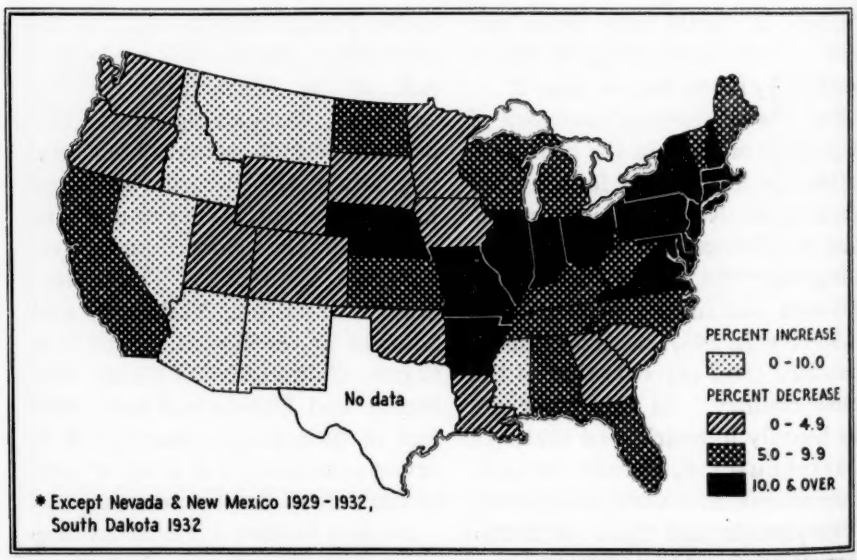
As may be observed from the map on page 2, the States which expe-

rienced decreases of less than 5 percent in birth rates from the period 1928-1932 to the period 1933-1937 are spread from the Atlantic to the Pacific Coasts and from the Canadian border to the Gulf of Mexico. However, only two of them, South Carolina and Georgia, are east of the Mississippi River. Although the 12 States included in this group covered 29.0 percent of the total area of the country, they contained only 15.5 percent of the country's total population—that is, 20,046,000—in 1937. These States are essentially rural in character. According to the last census, eight of them—South Carolina, Minnesota, South Dakota, Iowa, Wyoming, Oklahoma, Louisiana, and Georgia—had less than half of their people in communities of 2,500 or more, and the remaining four had only slightly more than half.

Five sparsely settled and essentially rural Mountain States—Montana, Idaho, Nevada, Arizona, New Mexico—together with Mississippi, an East South Central State, actually recorded higher birth rates in the later period, 1933 to 1937, than in the earlier period, 1928 to 1932. These States, though large in area, had a population of only 3,990,000 in 1937, or 3.1 percent of our total of 129,257,000. No birth data are available for Texas prior to 1933, the year it entered the birth registration area.

The direct relationship existing

GEOGRAPHIC DISTRIBUTION OF CHANGES IN BIRTH RATES FROM THE PERIOD 1928-1932* TO THE PERIOD 1933-1937



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between declines in the birth rate and the proportion of urban population in the various States of the Union, as indicated in the foregoing paragraphs, is clearly brought out by the coefficient of correlation, namely, $+ .585 \pm .097$. Also, when the percent declines in the birth rates in the States are correlated with the proportions of populations at ages 10 and over engaged in manufacturing and mechanical industries, the coefficient is found to be even higher, namely, $+ .634 + .087$.

The facts are clear. Only six States, with a very small fraction of our total population, have experienced increases in their birth rates in recent years. Of the remaining 41 States (no data are available for Texas), in which birth rates have fallen, the decreases were particularly marked where the populations were highly urbanized and industrialized. In these circumstances, it is seen that the country's population growth is more and more dependent upon its rural, nonindustrialized element. With this situation confronting us, it is obvious that our rural areas will need the guidance of child welfare and maternal aid agencies more than ever before if they are to continue as our chief source for population growth. Much can also be said with reference to their educational facilities, but that is not the purpose of this article.

Home Fatalities Most Frequent in Winter

MORE persons are fatally injured in accidents in and about the home during the winter months than in any other season. Beginning in October, with the coming of cooler weather, the number of deaths from home accidents rises each month until the maximum toll is reached in December or January.

One factor which undoubtedly accounts for some of the excess winter mortality is that people spend a greater part of their time at home in winter than at any other season, and consequently are more exposed to home hazards. There are, moreover, special hazards surrounding the home in cold weather, particularly those associated with heating appliances, and it is to these to which attention is especially directed. These particular hazards are revealed by an analysis of the death records of persons insured in the Industrial Department of the Metropolitan Life Insurance Company who died as a result of injuries received in home accidents during the years 1935–1937 inclusive.

Destruction of homes by fire is a deplorably frequent occurrence in winter. About one third of the deaths of insured persons in the home from burns and suffocation in conflagrations occur in the months of December and January. The heating plant is the origin of a large percentage of home fires, due principally to defective or overheated chimneys or flues. The very young and the old contribute a disproportionate number of deaths to the

annual toll, presumably because of their inability to save themselves in emergencies.

Deaths from burns, exclusive of those sustained in burning structures, also reach a maximum in winter. Almost one half the annual number of such deaths take place during the four months December through March. Coal stoves, gas stoves, and grates play an important part in the mortality from burns the year around, especially in the cold months. More women than men are victims of fatal burns, reflecting their varied household activities and the additional hazard of feminine clothing near open flames. Then, too, the practice of starting or speeding up a fire with kerosene or gasoline is still far too common. Children, as we have frequently pointed out in the STATISTICAL BULLETIN, are the principal victims of burns, particularly those due to scalding. The enforced indoor play of the winter season increases the exposure of small children to the risk of hot liquids.

More than one half of the deaths from inhaling illuminating and other poisonous gas in the home occur during the four months December through March. Greater use of gas heating appliances and the fact that homes all too often are poorly ventilated in the winter months, with people sleeping with the windows tightly closed, are contributing factors in the high mortality during these months. Escape of illuminating gas, which contains carbon monoxide, causes a majority of the fatalities. A survey of a number of cases of gas poisoning fatalities among insured persons showed that usually either a flexible pipe became detached from the heater, a gas jet was inadvertently turned on, gas fixtures leaked, or gas flames were extinguished by water boiling over or by a gust of wind. Poisoning by carbon monoxide gas emanating from coal, gas, or oil heaters without flues, in poorly ventilated rooms, added to the toll. In some instances persons were asphyxiated when stoves or furnace pipes became disconnected, or when the drafts were so set that partially burned gases escaped into the cellar or other parts of the house.

Many drivers of automobiles, particularly men, are asphyxiated as they run their motors in home garages where doors and windows are closed because of the cold. More than 50 percent of the deaths among these insured men and women occur during the four months December to March.

Deaths due to smothering, among children, are most frequent during the months December to March. Most of these fatalities are among infants and usually result from smothering by bed clothes, or by adults sleeping in the same bed. The use of heavy bed clothing and the temptation to take the baby into the bed are greatest during the cold weather.

The largest cause of fatal accidents in the home the year around is falling. Among adult policyholders the number of deaths from

home falls is fairly evenly distributed throughout the year, though somewhat larger in the winter months than at other seasons. Ice and snow on steps and walks contribute to the number of victims at this time of the year. Additional hours of darkness, too, increase the hazard of badly lighted rooms and stairways.

The Burden of Maternity

WHILE armies of men in various parts of the world are sporadically battling to destroy human life, an army of approximately 2,000,000 women in the United States alone is constantly and at all times bearing the burden of maternity, to renew life and to maintain the population. For we have annually about 2,250,000 live births, and each child brought to term has been sustained by its mother for three quarters of a year, so that $2\frac{1}{4} \times \frac{3}{4} = \frac{27}{16}$ or 1,700,000 women are at any time expectant mothers. Actually, the number of women involved is very considerably greater than this, because in addition to the 2,250,000 live births, there are annually about 80,000 stillbirths, and a very large number of abortions, estimated by some authorities, on the basis of rather uncertain data, at 680,000. If we take these facts into account, we see that the total number of women assuming the hazards of pregnancy and childbirth at any time must run close to 2,000,000.

As a militant army is composed of different units, each with its own characteristic hazards, so also the army of expectant mothers is composed of elements varying in characteristic life risk according to their age, order of pregnancy, viability of offspring, legitimacy and illegitimacy, etc.

As to age, maternal mortality is lowest among American women in the age group 20–24, in which years occur almost one third of all births. Very young mothers run a considerably higher risk, and above 20–24 years the risk increases with age, as shown in Table I, based on statistics for the general population of the United States in 1929 to 1933 (exclusive of South Dakota and Texas). It will be noted, for example, that among white females in the age group 35–39, the maternal mortality rate is more than twice that of the most favorable age group, and in the age group 40–44, it is three times that minimum.

Data regarding mortality in relation to parity (order of birth) are, unfortunately, scant and incomplete. It would be very desirable that our death certificates, in case of maternal deaths, should give the order of birth. Failing this indication, data must be obtained by special investigations. The results of one such study (based on statistics for New York State, exclusive of New York City, in the period 1931 to 1934) are shown in Table II, which presents the latest available

TABLE I

Maternal Mortality per 1,000 Live Births, by Color and Age of Mother in the United States (exclusive of South Dakota and Texas) For the Five-Year Period 1929 to 1933

AGE OF MOTHER	WHITE	COLORED
ALL AGES	6.0	10.7
10–14	13.8	22.9
15–19	5.1	10.1
20–24	4.2	7.6
25–29	5.0	9.5
30–34	7.0	13.1
35–39	9.8	17.2
40–44	12.5	21.1
45–49	16.5	32.5
50–54	38.3	53.8

data of this kind. Later figures, were they available in this detailed form, would show more favorable death rates, since, as recently reported in this BULLETIN, we have in the meantime benefited by marked improvement in maternal mortality. The figures in Table II, however, undoubtedly do show essentially the general character of the relation between maternal mortality and order of birth.

From this table it is clear, first of all, that a particularly high risk attaches to the birth of a first child. This is a familiar fact. Mortality of mothers is lowest for the second or third child, and increases irregularly for higher orders of children.

There is also a close connection between the mortality of the mother and the viability of the child born. Premature birth, stillbirth, or miscarriage may result from a condition which also leads to the mother's death. As a matter of fact, experience shows that the maternal mortality associated with stillbirths is of the order of 16 times that accompanying live births. Probably even worse is the situation in connection with abortions. Statistics in this field are notoriously inexact, because of the secrecy surrounding many of these cases. Dr. Frederick Taussig estimates that within the United States from 8,000 to 10,000 deaths arise from abortions annually. As to illegitimacy, in view of the unfavorable circumstances usually attending these births, it is not surprising to find that the maternal mortality accompanying illegitimate live births is more than double that accompanying legitimate births. Incidentally, the illegitimate births are, for the most part, among younger women. So, for example, in a special study made by the Children's Bureau, it was found that 52 percent of the unmarried mothers who died from puerperal causes

were under 20 years of age, while only 10 percent of the married women bearing children, comprised in this study, were in this age group. Undoubtedly one reason for the higher mortality is the greater prevalence of abortions among the unmarried mothers.

We have quite recently reported on the marked improvement in maternal mortality in the United States, and stressed the importance of intensified prenatal and subsequent care, if further progress is to be made. Our experience with such special precautions is still too limited for us to gauge how much we may expect to accomplish in this way. It has, however, been estimated that the lives of two out of three American women who die each year, during pregnancy, in childbirth, or shortly after childbirth, could be saved if these women received medical and nursing care of the type given by certain public health organizations concerned with this problem. But one thing is certain, namely, that prenatal care alone is not sufficient. Of equal importance and perhaps of greater importance will be the improvements which must be brought about in obstetrical practice. It is quite obvious that even with the best prenatal care, if obstetrical practice is deficient, good results cannot be obtained. We have it from the mouths of our surgeons and physicians that there has been a crying need for improvement in this field. There are already indications that these improvements in obstetrical care are becoming more available, but it will be some time before maternal mortality is brought down to the irreducible minimum obtainable under the best modern medical practice.

TABLE II

Deaths from Diseases of the Puerperal State per 1,000 Total Births (Including Stillbirths), by Number of Child in Order of Birth; New York State, Exclusive of New York City 1931 to 1934.

ORDER OF CHILD AT BIRTH	PUERPERAL DEATHS PER 1,000 TOTAL BIRTHS
TOTAL	3.74
First	4.41
Second	2.73
Third	2.72
Fourth	4.00
Fifth	3.75
Sixth	4.62
Seventh	4.30
Eighth	4.91
Ninth	4.78
Tenth or over	6.01

Source: New York State Department of Health, Fifty-fifth Annual Report, 1934, vol. II, p. xlv.

The Foundation of Population Rise and Decline

How far the American people have declined in their reproductive capacity since the early days of the Republic is seen when we compute the progeny of a typical group under the conditions of fertility and mortality prevailing, say, in 1800, and under current conditions. For 1800 direct data are not available, but a fairly safe estimate can be made, and this shows that 100 newborn girls of that year, if conditions had remained unchanged, would have had 223 daughters and 497 granddaughters. By 1933 the reproductive rate had fallen so far that, even with the greatly improved mortality, the original 100 would just reproduce their own number of daughters and also of granddaughters. Since 1933 our net reproductive capacity has fallen below the maintenance level, and according to the latest data available in a form adapted for this calculation—namely, those for 1936—every 100 newborn girls would have 95 daughters and 90 granddaughters. It is only a relative excess of women now in the childbearing ages, resulting from high birth rates in the past, that keeps us from actual decline in our numbers today. Such decline, in years to come, is inevitable unless our reproductive rates recover, in some degree at least, their former levels, or immigration is resumed on a considerable scale.

The facts set forth in the words of the preceding paragraph are exhibited graphically in the chart on page 9, which also shows, for comparison, relatively recent data for France and England and Wales. It may come as a surprise to some readers to see that the latter is in an even more unfavorable condition than France as regards net reproductive capacity. France has a longer period of low birth rates behind it than England, but in recent years the decline has been more rapid in the latter country. It is startling to see that in two generations the progeny of 100 newborn girls would dwindle to not much more than one half that number.

In addition to the data illustrated graphically in the chart, the facts for a number of other countries are shown in the table on page 10. It will be observed that among the countries with the lowest net reproductivity are Sweden, with 70 daughters and 49 granddaughters per 100 original newborn girls; and Norway, where the corresponding figures are 75 and 56. The majority of the countries listed are headed for a decline in population, as indicated by net reproductivities less than 100 percent. At the top of the list in reproductivity are Russia, 170, Japan, 154, Canada and Portugal, practically tied with 130 and 129. A rate such as that of Russia, if maintained through two generations, would result in granddaughters almost tripling in number the original cohort from which they sprang.

THE FOUNDATION OF POPULATION GROWTH AND DECLINE

Eventual daughters and granddaughters of 100 new-born girls, according to mortality and fertility for several periods and countries

Such is the foundation of population growth in countries like Canada, Italy, Japan, The Netherlands, Poland, Portugal, Russia; and of population decline in the remaining countries listed in the table.

Daughters and Granddaughters of 100 Newborn Girls, in Several Countries, According to Mortality and Fertility at Specified Periods

Country	Period	An Original Group of 100 Newborn Girls Will Have		Country	Period	An Original Group of 100 Newborn Girls Will Have	
		The Following Number of Daughters*	The Following Number of Granddaughters			The Following Number of Daughters*	The Following Number of Granddaughters
Australia	1932–34	96	92	New Zealand	1936	97	94
Canada	1930–32	130	168	Norway	1935	75	56
Denmark	1931–35	92	85	Poland	1934	111	123
England and Wales	1934–36	76	58	Portugal	1933	129	166
Finland	1933	90	81	Russia	1927	170	289
France	1935	87	76	Scotland	1934	91	83
Germany	1936	89	79	Sweden	1934	70	49
Italy	1933	118	139	Switzerland	1932	85	72
Japan	1930	154	237	United States, (whites)	1936	95	90
The Netherlands	1936	110	120				

*Net reproductivity, percent

Health Record for October 1938

THE sequence of unprecedentedly low monthly death rates, in the insured wage-earning population, which began in May 1937 and continued for 17 successive months, was broken in October when a mortality rate of 7.5 per 1,000 was registered. This does not mean that the mortality record for October was an unfavorable one. In fact, it was extremely good, as the death rate of 7.5 is very close to the previous October low, namely, 7.4, and is well below the average for this month since 1930, namely, 7.7.

The health picture for the year, to date, is more favorable than ever before. It is so good, indeed, that unless a widespread and virulent epidemic, or some great catastrophe occurs, during the few remaining weeks of 1938, this year, when completed, will register by a considerable margin the lowest death rate in the history of the millions of men, women, and children insured in the Industrial Department of the Metropolitan Life Insurance Company.

Whether or not a new minimum will be reached in the country at large cannot be determined at this writing. It is almost certain, however, judging by reports received by the Metropolitan Life Insurance Company from the health authorities of 21 States, that there will be a marked reduction in deaths as compared with last year.

The following table shows the mortality among Industrial policyholders for October 1938, September 1938, and October 1937, together with the death rates for the first 10 months of each year.

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Death Rate per 100,000 for Principal Causes. Weekly Premium-Paying Business in Industrial Department. All Ages (Annual Basis).*

MONTHS OF OCTOBER 1938, SEPTEMBER 1938, AND OCTOBER 1937

CAUSES OF DEATH	ANNUAL RATE PER 100,000 LIVES EXPOSED*				
	October 1938	September 1938	October 1937	Cumulative January-October 1938	Cumulative January-October 1937
TOTAL—ALL CAUSES	754.0	676.5	743.5	771.6	833.2
Typhoid fever	.9	1.6	1.0	1.0	.9
Measles	.1	—	.3	1.8	1.1
Scarlet fever	.4	.1	1.1	1.2	1.6
Whooping cough	1.4	3.0	2.7	2.1	3.2
Diphtheria	2.2	1.0	2.3	1.5	1.6
Influenza	4.7	2.1	4.7	7.2	19.4
Tuberculosis (all forms)	45.3	42.8	42.8	47.4	52.0
Tuberculosis of respiratory system	41.4	37.8	38.0	42.4	46.7
Syphilis, locomotor ataxia, and general paralysis of the insane	9.0	8.8	9.0	10.8	10.7
Cancer (all forms)	101.8	88.6	86.7	96.0	92.7
Diabetes mellitus	20.6	20.8	23.2	24.0	25.1
Cerebral hemorrhage; apoplexy	60.9	48.7	56.2	57.9	58.7
Diseases of the heart†	151.7	127.9	141.0	151.8	157.0
Diseases of the coronary arteries	35.6	29.0	28.6	33.4	29.7
Angina pectoris	6.6	5.8	6.5	6.7	7.7
Pneumonia (all forms)	35.6	27.3	41.0	51.4	68.4
Diarrhea and enteritis	9.4	11.4	12.4	7.5	9.3
Appendicitis	9.8	10.9	10.4	10.5	11.2
Chronic nephritis (Bright's disease)	49.3	42.8	50.5	52.7	54.7
Puerperal state—total	5.0	5.9	5.5	6.1	6.7
Suicides	8.9	8.4	6.7	9.2	8.6
Homicides	4.0	4.0	4.9	4.3	4.7
Accidents—total	49.5	50.7	51.7	48.4	53.8
Automobile accidents	16.9	18.4	23.3	16.9	20.5
All other diseases and conditions	141.1	135.0	154.2	138.7	154.2

*The rates for 1938 are subject to slight correction, since they are based on provisional estimates of lives exposed to risk.

†Excludes pericarditis, acute endocarditis, acute myocarditis, coronary artery diseases, and angina pectoris.

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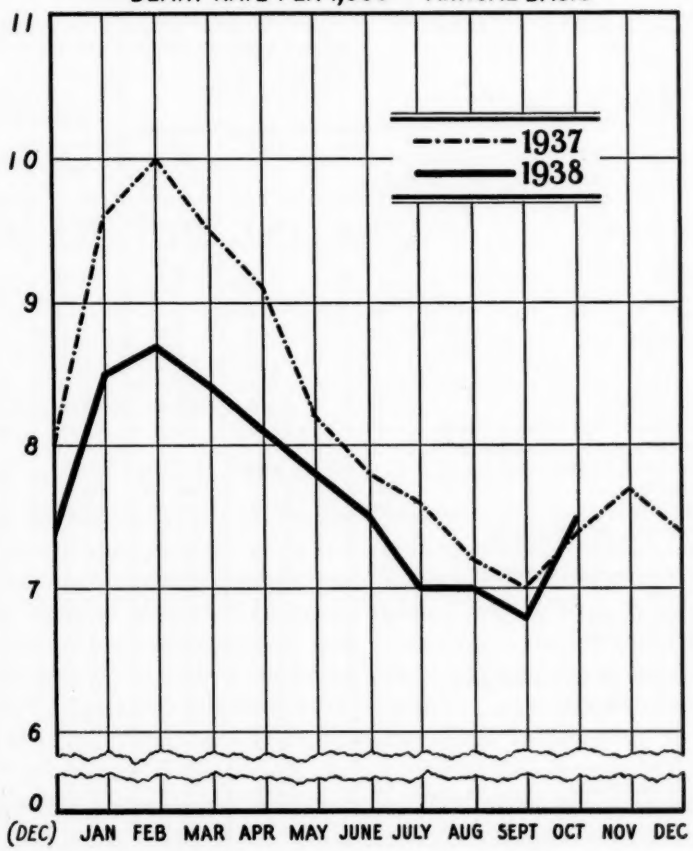
DEATH RATES FROM ALL CAUSES

METROPOLITAN LIFE INSURANCE COMPANY
INDUSTRIAL DEPARTMENT
WEEKLY PREMIUM-PAYING BUSINESS – TOTAL PERSONS

DEATH RATE PER 1,000 – ANNUAL BASIS



(DEC)	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
1937	9.6	10.0	9.5	9.1	8.2	7.8	7.6	7.2	7.0	7.4	7.7	7.4
1938*	8.5	8.7	8.4	8.1	7.8	7.5	7.0	7.0	6.8	7.5		

Rates are provisional

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